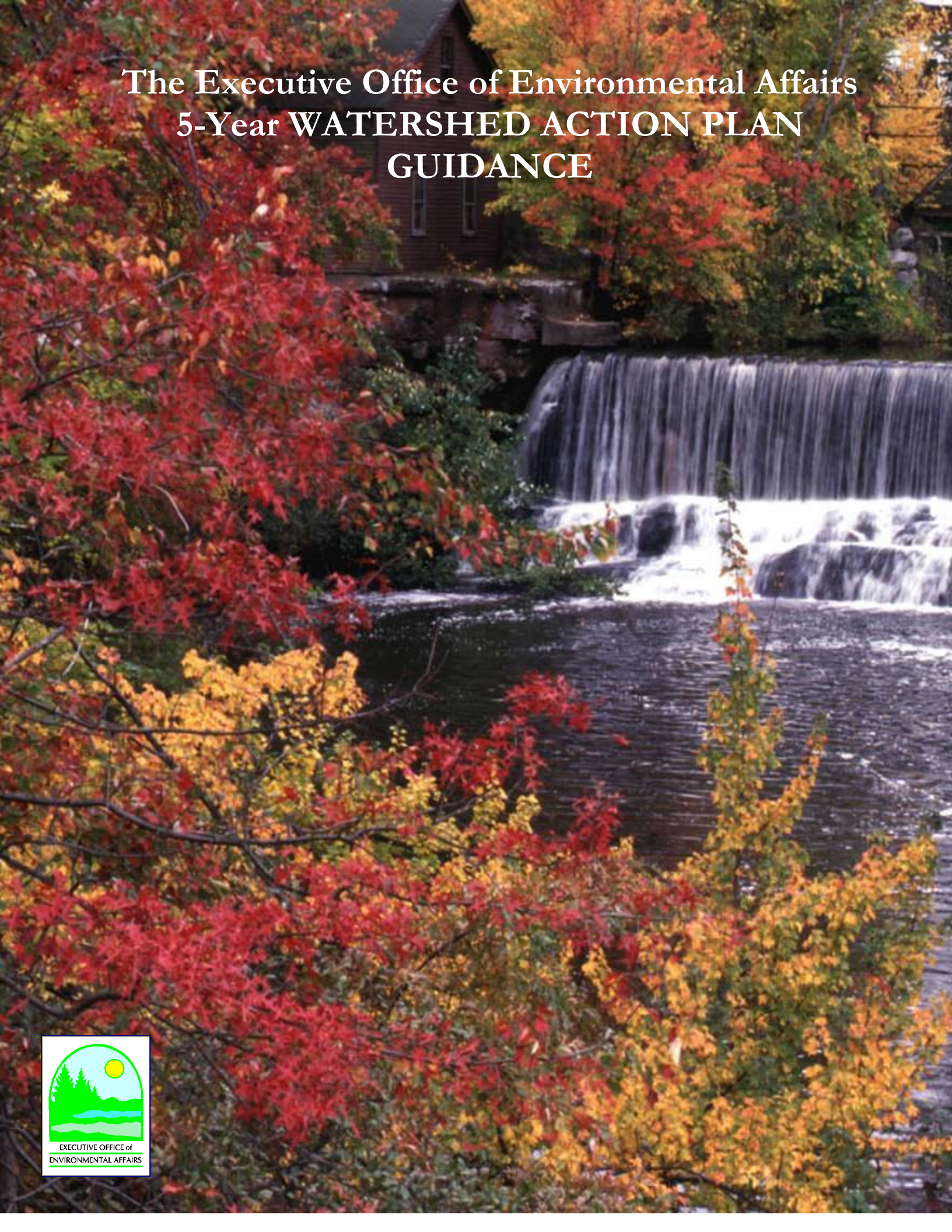
The Executive Office of Environmental Affairs
5-Year WATERSHED ACTION PLAN GUIDANCE



EXECUTIVE OFFICE of ENVIRONMENTAL AFFAIRS

Members of the WAP Task Force

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- Nancy Hammett
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- Alan Macintosh
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- Winona Wall
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I. INTRODUCTION

The Watershed approach typifies a process that brings together government and non-government partners to identify, discuss, prioritize, and implement issues, concerns, goals, objectives, and actions. These are aimed at preserving, protecting, and restoring the water resources and adjoining land resources of the Commonwealth of Massachusetts. The Watershed Action Plan (WAP) is a reflection of this cooperative effort to plan a unified and directed approach to managing our watersheds. It also represents a tool by which smart growth can be achieved. This document provides guidance and ensures consistency in all WAPs across the state.

II. HOW TO USE THE GUIDANCE?

The 5-year Watershed Action Plan (WAP) is a document that outlines various issues and priority areas in a watershed to help direct actions over a five-year period. Created by watershed partners, it charts a course of action for state agencies, watershed community partners and other decision makers within or related to the watershed. The WAP is a long-term strategy, which sets specific targets and measures. It is a concise and action-focused document. It is a culmination of elements of the watershed protection approach, formed through collaboration and consensus, reflecting the interests and concerns of different stakeholders within the watershed community.

This guidance document simplifies the WAP process, and provides definite recommendations on the WAP structure to enhance and promote expeditious completion of the plan. It sheds light on the process and the time frame involved. It is a flexible guideline, in that the process may be modified to cater to the uniqueness of each watershed.

III. PURPOSE OF THE WAP

The WAP creates an understanding of the watershed, identifies priority issues, and defines priority actions that protect, improve, and restore watershed resources. The WAP does this by providing an overview of the issues facing the watershed. This is informed in part by the outcome from projects in preceding year agency work plans, and partly by an extensive literature review. This sets the stage for the next five years of watershed protection and management.

The WAP also acts as an information tool and directs actions within the watershed. By bringing together the knowledge, commitment, and resources of all the community partners, as well as state and federal partners, the WAP can ensure that all major issues in the watershed are identified and adequately addressed through prioritized action strategies. The WAP integrates the main elements of the watershed approach: water quantity, water quality, habitat, open space and growth, recreation, outreach, and education.

Finally, the WAP and the process involved in developing and implementing the plan improves communication and coordination between the various state, federal and local governments, watershed organizations, businesses, regional organizations, and local citizens. It is also instrumental in expanding public involvement in watershed activities.

IV. AUDIENCE

The watershed action plan provides a coordinated approach to management in a watershed, and to foster environmental protection. The issues and priorities that are established by the local stakeholders (municipal government, non-governmental organizations, businesses, and local and regional groups) and state and federal partners will help guide agency agendas, and help direct agency funding and regulatory decisions to the highest priority issues. The WAP will also help outline priorities and actions that are needed at the municipal level so that actions established by the local community will be realized. Lastly, the WAP will guide watershed activities for the next five years and chart a course for watershed research, monitoring, and implementation activities in the watersheds by soliciting additional funds through other available grant programs.

V. PROCESS

It is estimated that development of the WAP document (including an assessment) should take about 12 months - from initial research of issues to the final draft (see Table 1). It is built upon outreach and projects that have been undertaken in earlier years. The 12-month period begins with a review of research documents and assessments conducted in the watershed over the previous 5-years.

At the outset of the WAP development process, i.e., in Month 1, the author/vendor must prepare a detailed time schedule of the entire 12-month period that includes dates for public meetings, draft documents, reviews, etc. This will help in prioritizing the WAP and facilitate keeping it on track.

1. *Parties Involved*

A selected author/vendor will take the lead in managing the planning process and producing the WAP with input from state agencies and from a broad group of watershed stakeholders. At the outset of the WAP development process, a WAP steering committee must be established that has a balance of representatives of the major interests in the watershed. This steering committee should include the Regional Planning Agency (RPA), key municipal representatives, state and federal agencies, watershed groups, businesses, and interested local citizens. The steering committee will be responsible for guiding the process and work needed to inform and develop the WAP, including overseeing the necessary research and outreach. The committee will, through discussions and research, inform the contents of the WAP.

2. *Bibliography*

At the outset of this planning effort, a list of reports, articles, studies, and plans relevant to the watershed should be compiled and researched. This bibliography will help support, lend credibility to, and document how and where issues, actions, and priorities are identified.

3. *Public Process*

Public participation is a critical requisite for a successful and executable WAP. It is imperative to generate input, support, buy-in, and recommendations from the public.

Extensive public outreach and review is essential to ensure that key issues are identified and priorities are set. The input process should be coordinated by the WAP steering committee using the services of the author/vendor responsible for developing the plan. Input must be actively sought from all parts of the watershed at regular intervals during the WAP development process. The local and regional groups can provide detailed expertise on issues and priority setting. These relationships with the local constituency may be advanced via stream teams, RPAs, or team development. Both the former entities work closely with local government and citizens.

An ***initial*** fact-finding effort should involve outreach and communication with specific municipal representatives[1] from each town in the watershed. Depending on the size of the watershed, this could take the form of separate meetings with each municipality or regional forums of subwatersheds or regions of towns. In addition, surveys, emails, phone follow-ups, and other information gathering techniques may be used. A high and consistent level of interaction with the towns will help ensure that watershed issues identified in the WAP are developed in consultation with municipal officials. The interactions will also identify the types of data that exist in the towns as well as identify and understand town priorities and actions that may be incorporated into the WAPs.

Prior to this municipal outreach, the author/vendor should ensure the communities have basic information they need in order to participate in the process. This could take the form of a briefing to each municipality, submitted along with the meeting notice, which includes:

- A brief introduction on the WAP purpose and process
- A call for towns to share their issues
- The main overarching issues facing the watershed
- Issues that may be of interest to the town
- Incentives for the town to participate, and
- Information that is requested of the town

The ***second phase*** of the outreach effort should take place after incorporating information acquired from municipal officials into the literature survey. This phase should involve public meetings in all subwatersheds or regions in the watershed. At this stage, the public is presented with a draft list of the most pressing issues facing the subwatershed and the watershed as a whole, as well as recommended actions based on input from town officials and various assessment data. Input is sought from the public to update, add, edit, change, and prioritize issues and actions.

The first part of the public participation thus includes collection of data and the initial input of issues and concerns. The second part includes a confirmation and clarification process.

[1] Local government structure may differ in towns. Municipal representatives may be the Town Planner, Town Manager, Conservation Commission, Board of Selectmen, planning boards, Board of Health, DPW, water suppliers, etc.

After incorporating these public comments, a draft WAP is developed. This plan must then be made available on the EOEA Watershed website for easy access to the public and for a ***third*** and more comprehensive review and comment period.

4. ***Review Process***

- **Internal Review:** Preliminary drafts of the WAP should be made available for comment first to the WAP Steering Committee and the EOEA/water policy staff. Final drafts should be submitted for comment to members of the water policy staff in Boston.
- **Agency Review:** The draft WAP will be reviewed by agency representatives on the steering committee, and an Interagency WAP Review Committee. It is the responsibility of these agency representatives to ensure that the issues, priorities and actions, particularly those related to agency actions or funding are agreed to by the agency. The review will take place on two occasions, i.e., once prior to and once after the public input process. If, based on agency comments, further changes are necessary, these will be carried out by the author/vendor. The author/vendor should respond to agency comments either by email or any other convenient form of communication.
- **Municipal Review:** All communities in the watershed must be given the opportunity to provide input, present their issues and priorities, and review the plan during different stages of the WAP development. Municipalities should also lend support to the WAP, either to specific action items (preferred) or to the WAP as a whole, via letters of support.
- **Non-Governmental Organization (NGO) Review:** The WAP should include active input and review from members of nonprofit watershed groups.
- **Support Letters:** Once the WAP has been reviewed and approved it should include letters of support from the EPA, state environmental agencies, the RPA, NGO's, towns, and area legislators. State environmental agencies must agree on the overall priorities of the watershed and those of the subwatersheds, and where possible endorse prioritized action items. Similarly, before the final draft is completed, the author/vendors are encouraged to get letters of support from local elected officials for the WAP as a whole and where possible, for specific action strategies.

5. ***Schedule***

The author/vendor and WAP Steering Committee should first develop a detailed timeline and task schedule to outline the steps needed to complete a WAP.

TIMEFRAME	ACTION
Month 1-2 OUTREACH	Identify and meet with key municipal representatives; develop a bibliography of existing data and reports; identify/reconfirm main issues in the basin. Form the WAP Steering Committee.
Month 2-5 RESEARCH and ASSESSMENT	Research of issues; sampling and data gathering. Research and assess data gathered during previous years to identify main issues, pinpoint areas still in need of research, and develop a watershed assessment. Solicit information from all partners, i.e., state agencies, environmental groups, RPA's, and businesses. Coordinate with municipal officials and other local partners to solicit town specific data, issues and priorities for the watershed assessment.
Month 6	Preliminary draft of document providing overall outline and priority issues, goals, objectives and actions, segregated by subwatershed/issue. Comments on draft by the WAP Steering Committee, state agencies, and incorporate into second draft.
Month 6-9	Present second draft (including comments from towns and municipalities) for public review via meetings in subwatersheds.
Month 9-12	Incorporate public comments into a third draft of the WAP. Post the draft on the EOEA watershed website and make IT available to state agencies for further comment (3 week period). Produce and distribute THE final WAP.

Table 1: Proposed timeline for the WAP development

6. *The Document*

The intent, purpose, and structure of the WAP as well as its implementation strategy must be clearly defined and explained both in the executive summary as well as the introductory chapter. The document itself may be structured in different ways depending on the characteristics of each watershed. Issues, priorities, strategies, and actions can be detailed in two different ways. In those watersheds where issues are common across subwatersheds, they may be delineated by **issue**. Where possible, action items must indicate the subwatershed where the action will occur. In all other cases, issues, goals and actions must be characterized by **subwatershed**. To make the issues and actions more tangible for the local communities the information may also be presented in an additional layer - by town.

Irrespective of the structure chosen, all sections in the WAP must be integrated in the conclusive chapter and in the executive summary. Also, the document should include a section that places the 5-year actions in context with larger more long-term goals for the watershed. The WAP should thus act as a planning document.

Each WAP must identify the issues **by priority** in the watershed as well as within a subwatershed. A clear connection should be made between subwatershed priorities and those at the watershed level. Within each issue, goals and actions must be clearly identified. A goal is defined as the desired state of the resources while an action is a means to achieve the goal. Action strategies may either be specific restoration, remediation, assessment, monitoring or planning efforts. Actions may also be an indirect route to achieving a goal, for example, outreach, education, surveys, workshops or conferences, training, etc.

VI. WAP CONTENT

The WAP document may be conceptually divided into two main parts. The first part is an assessment that provides useful information about the status of the watershed and the main prioritized issues affecting the watershed. This information is based on all available literature, including results from projects undertaken in prior work; information derived from various studies, plans, and research documents that are generated from state, federal, and local government, educational institutions, planning agencies, and consulting firms (see Appendix 1). This consolidated information may be presented either as a separate assessment document or summarized (with appropriate references) in a distinct chapter in the WAP. It is the information that is derived from this assessment that forms the basis for determining action strategies within each prioritized issue.

The second part of the WAP establishes specific actions that need to be implemented in the watershed to meet specified goals in each of the prioritized issues. Actions may be either short-term or long-term. All desired action strategies must be determined and outlined irrespective of the level of commitment achieved. Although a commitment is desired for all actions, it may not always be possible at the time of development of the WAP. Also, recommended actions should be directed toward each of the different audiences in a watershed: specific towns, RPAs, state and federal environmental agencies, watershed groups, businesses, and the public. Any actions that are recommended for beyond a 5-year term must be stated as a priority for the next 5-year planning effort.

Draft Outline

The following outline is to provide an idea of the topics that may be covered in the WAP.

A. Executive Summary: include the main highlights of the WAP i.e. brief outline of the process; brief description of the watershed; list overall priority issues; list subwatershed delineation and priority issues; and implementation strategy.

B. Table of Contents

C. List of Tables, Graphs, Maps, and Appendices

1. Possible Maps
   - Watershed Map
   - Water Resources
   - Land Resources (land use map)
   - Habitat – fisheries, rare species
   - Open Space
   - Current Development and Buildout Maps
   - Location of NPDES discharges, 21E sites

D. Introduction

1. Structure/Outline of the document – Describe the framework and layout of the document, purpose of the WAP, target audience, etc.
2. Watershed Overview – Briefly highlight physical and biological characteristics, socio-economic features, land use, and recreational resources.
   i. Physical Characteristics
      - Location
      - Water Resources - Ponds, Lakes, Coastal Waters and Reservoirs
      - Geology, Soils, and Groundwater
      - Climate
      - Hydrology - Wetlands
      - Water Quality Conditions
      - Water Quantity Conditions
      - Land Use, Ownership, and Management

   ii. Ecosystem Characteristics – types of ecological niches

   iii. Social and Economic Setting
      - Demographics
      - Buildout Analyses
      - Growth
      - Recreational and Scenic Resources
      - Cultural, Historic, and Archeological sites
      - Infrastructure
      - Scenic Resources
      - Agriculture

iv. Environmental Conditions – Describe main issues, by priority, affecting the watershed. This description must include each topical area (water quality, water quantity, water use and conservation, habitat, open space, recreation, education and outreach, growth and land use – see Appendix 3) in order of priority. Major issues as well as priorities should be substantiated by scientific data and informed by public input. Depending on the watershed, some of the issues above may be of less or no significance. In that case, it should be mentioned.

3. Process Summary of the development of the WAP.

E. Watershed Vision – Include in one paragraph the long-term goals for the watershed and overall vision.

F. Watershed players, activities, and achievements already concluded within the last five years, as well as those underway.

G. Implementation Priorities - The issues, objectives, and actions must be clearly **prioritized** based on scientific data and informed by the public input process. It must be clear how the priority issues and actions were determined. This prioritization and qualification will help state agencies in making crucial permitting and funding decisions. This section should include:

1. Watershed characteristics with respect to the main focus area of the watershed - describe and prioritize major environmental issues (main findings from the assessment).
2. Subwatershed Characteristics with respect to the main focus areas (see Appendix 3 for details).
3. Prioritized goals, objectives, and actions within each prioritized issue.
4. Action plan matrix either by year, subwatershed or hotspot area (see Appendix 9)
   i. Goal
   ii. Objective
   iii. Action to be taken
   iv. For each action include the following:
   - Responsible party - Responsibilities must be assigned irrespective of whether the party commits to prioritize and implement it within their agency, organization, etc. (for potential responsibilities, see Appendix 5).
   - Resources involved including overall costs, possible sources of funding, and technical assistance
   - Schedule of implementation (Year)
   - Subwatershed
   - Measurable results – it is important that actions are results-oriented leading to an environmental improvement (see Appendix 6).
5. Policy, legislative, regional, and statewide level recommendations that emerge from the planning effort.

H. Implementation strategy – Provide a framework describing how the various priority actions will be implemented. One option is the development of project scopes (to be used as applications toward various funding sources).

I. Conclusion and visionary statement with prioritization of future actions.

J. Appendices - possible appendices may include:
   1. Watershed committee members, partners and participants
   2. Public participation process and public input/comments
   3. Major permits issued in the watershed – include information regarding permittee, municipality, permit number, date issued and expired, receiving waters, type of permit, etc.
   4. List of all watershed lakes, streams, and river segments
   5. List of impaired waters
   6. Lake and impoundment data
   7. Hydraulic information on dams
   8. Bibliography
   9. Glossary of terms
   10. DEP-NPS action strategies
   11. Funding sources – state and federal

Appendix 1: Data Source by Agency

The following is a compilation of the kind of data that can be acquired from different local, state, and federal governmental agencies.

ACOE

- Water quality Data
- Flow Data
- Habitat/Wetlands restoration

CZM

- Stormwater
- Mussel Monitoring
- Salt Marsh Restoration
- MORIS Data
- Marine Monitoring
- Harbor Management Plans
- ACEC Management Plans

DEP

- Water Quality Assessments
- River, Lake, Marine Water Quality Data
- Waste Disposal
- 303d List
- 21E Site Information
- Major Permits: NPDES permits (major/minor), groundwater discharge, Chapter 91, Water Management Act
- Invertebrate Data
- Permitted Water Suppliers (Annual PWS Compliance Report)
- Source Water Assessment Program
- Outstanding Resource Waters
- Stormwater Management
- Fish Toxics
- Biological Assessment
- Eelgrass and Wetlands Data/Maps, Fish Population and Habitat Data, TMDLs

DCR *(former DEM)*

- Lake and Pond Data
- Lake and Pond Invasive Species
- In Stream Flow
- Land Use – Greenways & Trails
- Clean Lakes Program
- Forest Health/Information
- Non-threshold users & users below 100,000 gals
- Habitat
- Chapter 61 Lands
- Scenic Landscape Inventory
- Dam Data
- Hydrologic Analysis
- Flow Information: stream flow thresholds, low flow assessments, stream statistics
- Identification of Stressed Basins
- Precipitation Data
- All USGS Cooperative Programs' Data
- State Park Statistics, Trends, etc.
- Floodplain Control, Hazard Management

DCR *(former MDC)*

- Water Quality Data
- Habitat
- Land Use
- Forestry
- Master Plans
- Flood Control levels for USGS

DFG *(former DFWELE)*

- Sampling
- Habitat Plans/Assessments
- BIOMAP
- Fish Data
- Fish Passage
- Recreation Maps
- Shoreline Surveys
- Shellfish Reports/Monitoring
- Rare and Endangered Species

DAR *(former DFA)*

- Chapter 61A Lands
- APR Lands
- Farm Management Plans and Marketing Viability

EOEA
- MassGIS
- CPI

EPA
- Water Quality Data
- Sediment Data

FEMA
- Flood Maps

FERC
- Hydro Projects
- Dam Re-licensing

MEPA
- List of Activities by Watershed
- Summary of Projects

MHD

National Park Service

NRCS

RPAs
- Land Use
- Growth Plans
- Nonpoint and Stormwater Assessments
- Parcel Data
- Population Trends
- Open Space Plans
- Transportation Planning Process/ Regional Transportation Plans
- Economic Activity in the Watershed
- Employment
- Wellhead Protection Studies
- GIS
- Municipality Buildout Analysis

Towns
- Parcel Data
- Zoning Data
- Facility Master Plans
- Open Space Plans
- Buildout Analyses
- Capital Improvement Plans
- Comprehensive Plans
- Land Protection Plan
- Municipal Infrastructure Report
- Community Action Statements
- Wastewater Plans
- Watershed/Pond/Lake Plans
- Capital Facilities Plans

USF&W
- Habitat Assessment
- Fish Passage

USGS
- Sampling Data
- Flow Data
- Habitat Data
- Water Resources
- Fish Passage
- NAWQA Program

Watershed Assoc./NGO's (COLAP, Land Trusts)
- Water Quality Data
- Lake and Pond Data
- Open Space/Conservation Restrictions
- Shoreline Surveys

Appendix 2: Issue Information

The section on watershed overview should include information about each of the following focus areas. Where information and data is not available, it should be noted and planned for in the WAP as per established watershed priorities. The following is a list of data that should be considered when conducting an assessment for a watershed. This list will give an idea of the more significant issues in a watershed.

1. Water Quantity: Without enough water in our streams, lakes and aquifers, our ecosystems will be parched and human activities will ultimately be restricted. To effectively manage our watersheds, especially in light of recent drought conditions, it is imperative that this issue is addressed first. Each WAP should include an analysis of:
   - Instream flows
   - Water withdrawals in the basin
   - Inflow-outflow, water budgets
   - Interbasin transfers
   - Dam releases and their effects
   - Number of wells and their withdrawals
   - Water demand
   - Matrix of water users
   - Water shortages
   - Water conservation methods

2. Water Quality: Chemical indicators are one of the most commonly used indicators of water quality and consequently of river health. To gauge the quality of water in our streams and lakes effectively, the following information is necessary:
   - DEP water quality assessments
   - Sediment analysis
   - Public health advisories
   - 303d lists
   - TMDLs
   - NPDES permits
   - Drinking water compliance data/violations
   - Well closures
   - Septic system failures
   - Shoreline surveys
   - Dam safety
   - Shellfish closures
   - Fish advisories

3. Biological Data/Habitat: Aquatic biota is often used as the litmus that identifies structural or functional integrity of riparian ecosystems.
   - Fisheries
   - Shellfish
   - Invasive species
   - Bio-assessments/macroinvertebrates

- Vernal pools
- Species restoration plans
- Resource inventory and analysis
- Priority habitats
- Essential fish habitat

4. Open space, land use and growth: With growing pressures on our lands and increasing demands for water and land resources, it is important to protect and conserve what we currently have and plan for a sustainable future. An analysis of the following will help move us in the right direction of smart growth:
   - Buildout analyses
   - Open space plans (local and regional)
   - Demographic data, transportation plans
   - Land trusts
   - Sustainability index

5. Recreation
   - Public access board sites
   - State's work plan
   - Greenway trails
   - Fish stocking data

6. Outreach and Education
   - Stream teams
   - Newsletters
   - Events
   - Media
   - Town meeting votes on environmental issues

Appendix 3: Data Contacts by Agency

AGENCY/SOURCE	CONTACT (Name, #)
ACOE	
Water Quality Data	
Flow Data	
Habitat/Wetlands Restoration	Bill Hubbard 978-318-8552 or Chris Hatfield 978-318-8520
CZM	**Watershed Contact: Todd Callaghan 617-626-1233**
Coastal Hazards	Storm Damage, Rebecca Haney-Inglin x1228
Stormwater	Stormwater Discharge Permitting, Todd Callaghan ext 1233
Mussel Monitoring	Christian Krahforst ext 1216
Aquaculture	Paul Somerville ext 1203
Marine Monitoring	Christain Krauforst ext 1216
Wastewater Treatment Plant/Facilities Plans	Todd Callaghan ext 1233
NPDES (Power Plants and WWTP's)	Todd Callaghan ext 1233
Water Quality	Todd Callaghan ext 1233
Habitat/Wetlands Restoration	Bruce Carlisle, ext 1205
DEP	**Main contact Rick Dunn (Water Quality) 508-767-2874/ Arthur Screpetis (Grants) 508-767-2875**
Water Quality Assessment	DEP CONTACT: Rick McVoy 508-767-2877
Waste Disposal	DEP NPDES CONTACT: Paul Hogan; SERO Dave Burns 508-946- 2838
303d List	Arthur Johnson 508-767-2873
TMDL's	Russ Isaac, TMDL Coordinator, 508-767-2876
21E Site Information	Need to distinguish between state and federal sites: 292-5500
NPDES Permits – major/minor	Bryant Firmin, NPDES Coordinator, 508-849-4003; Paul Hogan; SERO Dave Burns 508-946- 2838
Invertebrate Data	Bob Nuzzo, DEP Worcester 508-767-2792; Art Johnson 508-767-2873
Permitted Water Suppliers (Annual PWS Compliance Report)	Regional Water Supply Chief. SERO Larry Dayian 508-946-2769
Source Water Assessment Program	Kathy Romero, DEP Boston 617-292-5727

AGENCY/SOURCE	CONTACT (Name, #)
Outstanding Resource Waters	Bruce Bouck, DEP Boston 617-556-1055; Russ Isaac 508-767-2876
Stormwater Management	Stormwater Discharge Permitting, Phase II Coord, Jenny Scarlet 508-767-2797 or Linda Domizio, Phase II Planner, 508-849-4005
Fish Toxics	Bob Maietta 508-767-2793 also Art Johnson 508-767-2873
Biological Assessment	Art Johnson: 508-767-2873
DCR	**Watershed Contact: Mike Gildesgame, 617-626-1371**
Lake and Pond Data	Jim Straub 617-626-1411, Anne Monnelly 617-626-1395 or Steve Asen 617-626-1355
In Stream Flow	Vicki Gartland 617-626-1369 or Linda Marler 1384
Land Use – Greenways & Trails	Jennifer Howard 413 -586-5706 x 18
Forestry	617-626-1250
Forest Fire Control	MikeTirrell 413-784-1828 ext. 26
Habitat	Jack Lash 508-792-7716 x 137 or Andy Backman 508-278-0789
Chapter 61 Lands	Mary Griffin 617-626-1303 or Irene Del Bono 617-626-1315
Flood Hazard Management/NFIP	Richard Zingarelli 617-626-1406
Ocean Sanctuaries	Mike Gildesgame 617-626-1371
Scenic Landscape Inventory	Jessica Rowcroft 617-626-1380 or Patrice Kish 617-626-1378
Dam data	Bill Salomaa 617-626-1410 or Dave Clark 508-792-7716 x 115
Hydrologic Analysis	Vicki Gartland 617-626-1369 or Linda Marler 1384
ACEC Program	Leslie Luchonok 413-586-5706 x 21 or Liz Sorenson 617-626-1394
Water Quality Data	
Habitat	
Land Use	Planning Office
Forestry	
Landscape Architecture	Planning Office
Dam Data	727-5114
DFG	**617-626-1590**
Sampling	
Habitat (Ipswich)	

AGENCY/SOURCE	CONTACT (Name, #)
Fish Data/Toxics	626-1590
Fish Passage	626-1590
Recreation Maps	
Rare and Endangered Species	Natural Heritage, Henry Woosley 508-792-7270 ext 200
Dam Data	Karen Pelto, ext 1542
DAR	**617-626-1700**
Chapter 61A Lands	Deputy DAR Commissioner
Ag. Preservation Restriction Lands	Chris Chisholm 508-792-7716
DMF	
Shellfish Monitoring Program	Varies by shoreline area. Frank Germano and Neil Churchill for South Shore - Pocasset Office
Fish Passage	Dick Quinn
EOEA	**617-626-1000**
SCORP	Jennifer Soper, ext 1015
Water Quality Data	Bruce Carlisle, ext 1205
EPA	
Water Quality Data	NPDES Data - Freedom of Information Request Office
Sediment Data	
FEMA	
Flood Maps	DCR MEMA Office: Rich Zingarelli 617-626-1406
FERC (Federal Energy Regulatory Commission)	
Hydroprojects	
Dam Re-licensing	
Massachusetts Highway	
Environmental Enhancement Program	Linda Walsh, State Coordinator, 617-973-8052
District Office, SE Mass	Mark Carmichael, District Manager, 508-884-4253

AGENCY/SOURCE	CONTACT (Name, #)
RPAs	**SRPEDD: 508-824-1367**
Land Use	
Growth Plans	
Non-point and Stormwater assessments	
Parcel Data	
Population Trends	
Open Space Plans	
Towns	
Parcel Data	Assessor or Engineering Offices
Zoning Data	Planning Board
Facility Master Plans	Wastewater Treatment Superintendent or DPW Superintendent
Open Space Plans	Planning or Conservation
Buildout Analyses	MassGIS
USF&W	
Habitat assessment	
USGS	
Sampling Data	
Flow Data	
Habitat Data	
Water Resources	
Fish Passage	
NAWQA Program	
Watershed Assoc./ NGO's (COLAP, Land Trusts)	
Water Quality Data	
Lake and Pond Data	
Open Space/Conservation Restrictions	
Shoreline Surveys	

Appendix 4: Participation on Action Strategies

The information presented below is to help watershed partners in determining areas of collaboration with the different entities within a watershed.

MUNICIPAL

Interboard cooperation to achieve municipal goals

Water Quantity
Infiltration/Inflow reduction
Stream gauge installation
Flood warning response plan
DPW maintenance of floodways
Flood control
Monitoring of wells
Develop/update water conservation by-laws
Implement non-structural flood control measures
Adopt policy of no flood-prone buildings in watershed
Restrictive and consistent floodplain management

Water Quality
Priority area sewering
Remediation
Sewage Treatment upgrades
Stormwater compliance
Implement NPS recommendations
Landfill capping
Identify nonpoint source pollution
Storm drain analysis
Reduction of nutrient loadings
Reduction of road sand deposition into waterways
Reduction of stormwater discharges
Sewering

Habitat
Lake and pond assessment
Riverfront zone review
Pond restoration
List of invasive species sites
Non-native species management
Encourage planting native species
Wetlands inventory and restoration
Wetland banking feasibility
Adoption of a regulatory review area adjacent to wetlands

Open Space
Update Open Space Plans
Update zoning by-laws – amend to protect streams, banks, riparian zone
Land use planning in coordination with sewage treatment & water supply

Recreation
Create trails
Public access inventory
Provide canoe access

Other
Update Comprehensive and other Municipal Plans
Implement EO 418
Implement EO 385

WATERSHED GROUPS

Water Quantity
Develop model water conservation plans
GIS land use analysis for water suppliers

Water Quality
Prioritize monitoring sites based on 303d list
Development of incentive-based model ordinance for septic systems inspection and maintenance

Habitat
Invasive species reduction

Riverfront zone review
River cleanups

Recreation
River recreation survey

Other
Outreach and education
Public forums

RPAs
Prioritize monitoring sites based on 303d list
Zoning by-laws
Model and matrix of existing municipal laws
Coordinated land-use and resource constraints
Consultation with towns on open space plans

DEP
DO monitoring
Biomonitoring stations
Reissue minor NPDES permits
Sampling plans
Remediation
TMDL development
Lake and pond assessments
5-year WMA permit reviews
Addition of water quality monitoring stations
Decrease direct stream discharge of stormwater
Stormwater management

DCR (DEM)
Dam studies with prioritized recommendations
Comprehensive water supply plans
Forest management for public water supplies
Flow modeling
Instream flow studies
Level of water use and their effect on supply
Flood control mechanisms
Regional river recreation management plan

DCR (MDC)
ACEC Plans
Flood Control

DFG
Shoreline surveys
Prioritize monitoring sites based on 303d list
Examine streambed conditions for ability to meet anadromous habitat
Examine potential for reversal of fish passage blockages
Recommendations for river restoration
Riparian restoration
Review stream morphology and habitat characteristics
Pond and lake eutrophication assessment

USDA – NRCS
Assistance on agricultural issues (with cooperation of farmer)
Nonpoint source assessment
Stormwater management
Operation and maintenance of municipal dams
Shellfish bed remediation
Sedimentation and erosion control
Development impact reviews

Appendix 5: Measurable Results Metrics

Metrics measure the progress in the watershed on a particular issue and action. The following may be used in the WAP as measures against specific action strategies.

Water Quality

# of river miles, lakes and ponds assessed
# of miles supporting designated uses
# of river miles surveyed by volunteers with a QAPP
# of lakes and Ponds studied
# of shoreline surveys conducted by volunteers
# of new miles designated as "wild and scenic" by state and federal
# of stream/river clean up projects conducted in watershed
# of lakes and ponds safe for swimming

Water Quantity

Amount of impervious surface
Change in base flows
# of hydrology assessments conducted
Average quantity of water withdrawals
# of water level measurements
# of stream gauges
# of stressed basins

Habitat

# of habitat studies/surveys conducted
# of species threatened, or endangered areas
Acres of wetlands restored
# of dams in the watershed, number of those in need of repair, and number of those that provide fish passage
# of lakes/ponds with non-native invasive species
# of river miles identified with non-native invasive species
% of watershed that is protected open space
# of certified vernal pools
# of miles with fish swimming
Type of fish communities
# of acres in Chapter 61

Land use and potential threats to water quality

# of landfills
# of high threat operations to groundwater or surface water sources (from DEP SWAP)
# of permitted or registered water withdrawals greater than 100,000 gallons
# of interbasin transfers proposed, and number of those approved
% of impervious surface by subwatershed

% of known 21E sites remediated or in remediation

Local planning

List of towns with approved open space plans
List of towns with a recent master plan (less than ten years old)
# of approved cluster or conservation-planned subdivisions and percentage of total subdivisions that are cluster or conservation planned
# of communities with digitized parcel information
# of towns with environmental zoning by-laws: cluster, aquifer protection, etc.

Land Use/Open Space

# of acres of protected "greenspace" in the watershed
% of developed property within 200 ft. buffer zone of rivers within the watershed

Recreation

# of trail miles added
# of public access points
# of beach closure days
# of local trail plans

Outreach and Education

# of training or awareness/education programs conducted in the watershed
# of presentations on watershed issues in municipal meetings
# of workshops and watershed-wide forums held
# of press releases on watershed issues

Shared Responsibility

# of statewide "micro" watershed groups
# of businesses engaged in watershed work
# of lakes and ponds with active advocacy group
# of grants written
# of grants received
# of community/civic awards distributed

Appendix 6: Glossary of Terms

Commonly Used Words and Their Definitions

Aquifer – An underground geologic formation capable of holding large quantities of water. Aquifers may serve as a source of drinking water.

Bacteria – Microscopic one-celled organisms found everywhere. Some bacteria have the potential to be a public health threat. In Massachusetts there are defined limits for a specific bacteria, fecal coliform, in water bodies.

Basin – A topographic designation based on drainage patterns. The water flowing within a basin (or watershed) eventually flows to one common point.

Best Management Practices (BMPs) – Techniques which may be nonstructural, structural, or managerial capable of effectively and economically reducing nonpoint source pollution.

Biomonitoring – Examining the biological (living) communities in a given body of water (or other habitat) to determine the complexity, diversity, and species composition in the water body. This information helps assess the overall health of the habitat.

Board of Health (BOH) – In Massachusetts, it is the local board responsible for health issues in the community including septic systems.

Buffer – An area of no or limited activity along a waterway or wetland functioning as a filter of pollutants contained in runoff, a wildlife corridor, and several other benefits.

Clean Water Act (CWA) – A federal law establishing comprehensive national policies for water quality management. The essence of the CWA is to have all U.S. waters "fishable and swimmable".

Conservation Commission (ConComm) – A volunteer board within a Massachusetts community responsible for administering the Wetland Protection Act and the River Protection Act.

Effluent – Used water as it leaves a treatment system. Examples are discharges from sewage treatment facilities or water used in an industrial cooling system.

Fresh Water - Water with less than 0.5 parts per thousand dissolved salts.

Geographical Information System (GIS) – A relatively new and useful computerized system able to create data layers amenable to transfer onto maps and other useful products for assessing a river basin. Data layer examples include all open space, watershed boundaries, and land use.

Groundwater - Water found in the spaces between soil particles and cracks in rocks underground (located in the saturation zone). Groundwater is a natural resource that is used for drinking, recreation, industry, and growing crops.

Hydrograph - Graph showing variation of water elevation, velocity, streamflow, or other property of water with respect to time.

Hydrologic Cycle - (also known as the water cycle) The paths water takes through its various states - vapor, liquid, solid - as it moves throughout the ocean, atmosphere, groundwater, streams, etc.

Impervious Surface – A surface which does not allow water to penetrate, such as pavement.

Interbasin Transfer – A transfer of drinking water or wastewater from one basin into another. These transfers are regulated by the state (Department of Environment Management). Transfers between basins but within the same town do not require a permit.

Nitrate – A form of nitrogen readily usable by vegetation. Excessive amounts of nitrate can disrupt ecological balances in a natural system. High levels of nitrate in drinking water pose a health threat, especially for children (blue baby syndrome).

Nonpoint Source Pollution (NPS) – Pollution originating from widespread, multiple and not easily identifiable sources. Stormwater is a significant contributor of nonpoint pollutants since it washes pollutants from impervious surfaces such as roadways.

National Pollution Discharge Elimination System (NPDES) – A federal program under the Clean Water Act created to monitor point source discharges such as sewage treatment plant effluent and industrial discharges.

Nutrient - Element or compound essential for animal and plant growth. Common nutrients in fertilizer include nitrogen, phosphorus, and potassium.

On-site Systems – An individual system for treating wastewater, commonly called a septic system.

Precipitation - The part of the hydrologic cycle when water falls, in a liquid or solid state, from the atmosphere to Earth (rain, snow, sleet).

Phosphorus – A nutrient often serving as the limit to growth in freshwater systems. Excessive amount of phosphorus in a water body can lead to a condition of unchecked plant growth known as eutrophication.

Recharge - Groundwater supplies are replenished, or recharged, when water enters the saturation zone by actions like rain or snow melt.

River Protection Act (RPA) – A law creating a 200-foot river resource area around most of the perennial rivers and streams in Massachusetts to better protect the quality of our river resources. The RPA expands the scope of the Wetland Protection Act.

Runoff - Precipitation that flows over land to surface streams, rivers, and lakes.

Safe Drinking Water Act (SDWA) – A federal law passed in 1974 creating a federal program to monitor and increase the safety of drinking water. Amended in 1986 to establish new enforcement responsibilities for the EPA and changes in nationwide safeguards.

State Revolving Fund (SRF) - A fund from which a community can apply for zero interest loans to assess or improve wastewater problems in the community. Scope of the SRF has recently been expanded.

Storm Drain - Constructed opening in a road system through which runoff from the road surface flows into an underground system.

Temporary Wetland - A type of wetland in which water is present for only part of the year, usually during the wet or rainy seasons; also known as vernal pools.

Title 5 – The Massachusetts regulation overseeing on-site wastewater treatment systems. Improperly or poorly functioning on-site systems (septic systems) have the potential to adversely impact nearby waterways.

Total Maximum Daily Load (TMDL) – The Federal Clean Water Act requires each state to identify waters for which effluent limitations are not stringent enough to meet water quality standards. The TMDL established the allowable pollutant loading from all contributing sources to achieve water quality standards. TMDLs may also be applied to waters threatened by excessive pollutant loading (i.e., nonpoint sources).

Tributary – A stream or river flowing into a larger, mainstream river.

Unconfined Aquifers - An aquifer in which the upper boundary is the water table.

Wastewater – Water, which is used for some purpose, then discarded or "wasted". Usually refers to the water used in households, businesses, and industry and containing wastes.

Water (H_2O) - An odorless, tasteless, colorless liquid made up of a combination of hydrogen and oxygen. Water forms streams, lakes, and seas, and is a major constituent of all living matter.

Water-bearing Rocks - Several types of rocks can hold water, including: sedimentary deposits (sand and gravel), channels in carbonate rocks (limestone), lava tubes or cooling fractures in igneous rocks, and fractures in hard rocks.

Water Table - The point below the land surface where groundwater is first encountered and below which the earth is saturated. Depth to the water table varies widely across the country.

Watershed – An area of land contributing runoff to one common point. A large watershed may be divided into smaller sub-watersheds. Massachusetts has been divided into 27 major watersheds (The land area from which surface runoff drains into a stream, channel, lake, reservoir, or other body of water; also called a drainage basin-USGS definition).

Wetland – Area of land with saturated or nearly saturated soils most of the year and serves as an interface between land-based and water-based environments. Other common names for wetlands are sloughs, ponds, and marshes.

Drawn from DFG (formerly known as DFWELE) – River ways Program; USGS.

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Appendix 8: Sample Action Matrices

Matrices may be set up either by Action item or by Subwatershed.

1.

Action	Subwatershed or Hotspot Area	Responsible Party	Year/Schedule					Proposed Funding Source	Measurable Results
			1	2	3	4	5		
Goal 1									
Objective 1									
Actions									
Objective 2									
Actions									
Goal 2									
Objective 1									
Actions									

2.

Subwatershed	Responsible Party	Year/Schedule					Proposed Funding Source	Measurable Results
		1	2	3	4	5		
SUBWATERSHED NAME								
Goal #								
Objective #								
Action 1								
Action 2								
Action 3								